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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,103	09/19/2006	Jianming Wu	7000-354-1A	4121
27820 7590 01/03/2011 WITHROW & TERRANOVA, P.L.L.C. 100 REGENCY FOREST DRIVE SUITE 160 CARY, NC 27518			EXAMINER ZAIDI, IQBAL	
			ART UNIT 2464	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/599,103

Applicant(s)

WU ET AL.

Examiner

IQBAL ZAIDI

Art Unit

2464

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-18 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-18 and 20-26 is/are rejected.
- 7) ☒ Claim(s) 6 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-940)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The instant application having application No 10/599103 filed on 10/25/2010 is presented for examination by the examiner.

Allowable Subject Matter

2. **Claims 6 and 19** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Argument

3. Applicant's arguments, see pages 7 to 12 of the Applicant's Remark, filed 10/25/2010, with respect to the rejection(s) of claims 1-26 under 35 USC § 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejections are made in view of Walton et al (CA 2404055, Sep. 19, 2002), Branlund et al. (US 20080181170, Jul. 31, 2008).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-5, and 7-13** are rejected under 35 U.S.C 103(a) as being unpatentable over Walton et al (CA 2404055, Sep. 19, 2002) in view of Branlund et al. (US 20080181170, Jul. 31, 2008) hereinafter (Branlund).

Regarding **Claim 1**, Walton discloses a method for scheduling data for transmission during a transmit time interval in a multi-carrier communication environment comprising determining channel condition indicia for a plurality of users (page 31, line 19-25, *During normal system operation, requests for data transmissions are received from various users (plurality of users) throughout the system. The cells are then tasked to schedule the data (scheduling the data) transmissions and to assign channels (multi-carrier) to the users such that high efficiency and performance are achieved (determining channel conditions)*); in an iterative manner (page 27, line 5-6, *The iterative process (iterative manner) can continue until the effective link margins for the cells*); pre-assigning select tones for each remaining user of the plurality of users that has not been permanently assigned tones for the transmit time interval (page 74-75, line 5-7 and 20-25, *data processor 1520 assigns each channel data stream (pre-assigning select tones) to one or more sub-channels, at one or more time slots, and on one or more antennas, after assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the*

data in the channel data stream is modulated using multi-carrier modulation, orthogonal frequency division multiplexing (OFDM) modulation is used and the modulation symbol vector is associated with a specific sub-channel having a unique frequency or tone on which the modulation symbols is conveyed, the collection of theses modulated symbols are all orthogonal to one another at each time slot and for each antenna);

selecting a remaining user having least favorable channel conditions as an active user (page 46, line 15-22, Channels assigned to users with conditions. Such conditions may include, limitation on the data rate, a maximum transmit power, restriction on the set point, and so on. A maximum data rate imposed on a channel (favorable channel condition) assigned to an active user);

wherein once the select tones are permanently assigned to the active user, the active user is no longer a remaining user (page 43, line 15-22, if channel metrics based on outage probability are employed (assigned), the selected user is assigned the channel with the highest outage probability. The assigned user is then removed from the list of active users, at step 1018. A determination is then made whether the active user list is empty (no longer remaining user), indicating that all active users have been assigned channels).

Walton discloses all aspects of the claimed invention, except permanently assigning to the active user the select OFDM tones pre-assigned to the active user.

Branlund is the same field of invention teaches permanently assigning to the active user the select OFDM tones pre-assigned to the active user (page 6, par(0150), line 3-6, every active user a cell of the network is assigned a preamble sequence and a

designated partition (permanently assigning OFDM tones) for requesting system access over a channel).

Walton and Branlund are analogous art because they are from the same field of endeavor of access to a service device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Walton to include the teaching of Branlund because it is providing OFDM, a digital processing architecture includes fast transforms, and beamforming and null steering algorithms and stacked carrier spread spectrum to increase system capacity.

Regarding **Claim 2**, Walton discloses the select tones permanently assigned to active users are no longer available for pre-assignment to the remaining users (page 43, line 15-22, *if channel metrics based on outage probability are employed (assigned), the selected user is assigned the channel with the highest outage probability. The assigned user is then removed from the list of active users, at step 1018. A determination is then made whether the active user list is empty (no longer remaining user), indicating that all active users have been assigned channels*).

Regarding **Claim 3**, Walton discloses initiating scheduling for the transmit time interval for the plurality of users using the select tones permanently assigned to each of the plurality of users (page 31, line 20-25, *The scheduling of the data transmissions and the assignment of the resources to the users can be achieved based on a number of*

factors. Such factor may includes, the priority assigned to active users, criteria related to fairness, and one or more channel metrics).

Regarding **Claim 4**, Walton discloses for each remaining user, pre-assigning the select tones comprises sorting tones in light of channel condition information (*page 46, line 15-22, Channels assigned to users with conditions. Such conditions may include, limitation on the data rate, a maximum transmit power, restriction on the set point, and so on*); and selecting ones of the tones having most favorable channel conditions as the select tones (*page 46, line 15-22, Channels assigned to users with conditions. Such conditions may include, limitation on the data rate, a maximum transmit power, restriction on the set point, and so on. A maximum data rate imposed on a channel (favorable channel condition) assigned to an active user*).

Regarding **Claim 5**, Walton discloses for each remaining user, selecting ones of the tones further comprises minimizing a number of tones pre-assigned as select tones while ensuring a target data rate is achieved in light of the channel conditions associated with each of the select tones (*page 74-75, line 5-7 and 20-25, data processor 1520 assigns each channel data stream (pre-assigning select tones) to one or more sub-channels, at one or more time slots, and on one or more antennas, after assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the data in the channel data stream is modulated using multi-carrier modulation, the*

collection of theses modulated symbols are all orthogonal to one another at each time slot and for each antenna).

Regarding **Claim 7**, Walton discloses selecting a remaining user further comprises determining a scheduling factor for each remaining user based on the channel condition indicia(*page 31, line 20-25, The scheduling of the data transmissions and the assignment of the resources to the users can be achieved based on a number of factors(scheduling factors). Such factor may includes, the priority assigned to active users, criteria related to fairness, and one or more channel metrics (channel conditions));* and selecting the remaining user having the least favorable scheduling factor as the active user(*page 31, line 20-25, The scheduling of the data transmissions and the assignment of the resources to the users can be achieved based on a number of factors(favorable scheduling factors). Such factor may includes, the priority assigned to active users).*

Regarding **Claim 8**, Walton discloses all aspects of the claimed invention, except *the data scheduled for transmission is real-time data.*

Branlund is the same field of invention teaches the data scheduled for transmission is real-time data (*page 37, par (0711), line 3-6, the spectral tone constellation encoder 702, IDOFFT modulator which converts complex tones into real time data for transmission).*

Regarding **Claim 9**, Walton discloses all aspects of the claimed invention, except *the data scheduled for transmission is voice information.*

Branlund is the same field of invention teaches the data scheduled for transmission is voice information (*page 12, par (0256), line 3-6, A channel divided into smaller, lower rate channels for specialized transmissions such as voice transmissions*).

Regarding **Claim 10**, Walton discloses groups of the tones with a time and frequency continuum associated with the transmit time interval are associated with channels(*page 16, line 20-25, The cells can (continuously) transmit to users using the allocated frequency bands, the available resources are allocated in a manner to achieve high efficiency*), and the tones are pre-assigned to the remaining users and permanently assigned to the active users according to corresponding channels(*page 74-75, line 5-7 and 20-25, data processor 1520 assigns each channel data stream (pre-assigning select tones) to one or more sub-channels, at one or more time slots, and on one or more antennas, after assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the data in the channel data stream is modulated using multi-carrier modulation, orthogonal frequency division multiplexing (OFDM) modulation is used and the modulation symbol vector is associated with a specific sub-channel having a unique frequency or tone (permanently assigned) on which the modulation symbols is conveyed, the collection of theses modulated symbols are all orthogonal to one another at each time slot and for each antenna*).

Regarding **Claim 11**, Walton discloses all aspects of the claimed invention, except *groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead.*

Branlund is the same field of invention teaches groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead (*page 38, par (0715), line 3-6, The goal is to minimize constant overhead by using optional extended MAC header, which are used for short and more frequent MAC messages, such as bandwidth request, partition allocation, timing adjustment, etc).*

Regarding **Claim 12**, Walton discloses the number of tones pre-assigned to remaining users increases with each re-transmission attempt (*page 42, line 35-38, if the user's expected outage probability for a particular channel is excessive(increases), there could be a reasonable likelihood that the entire transmission on that channel will be corrupted and needs to be re-transmitted*).

Regarding **Claim 13**, Walton discloses the multi-carrier communication environment is an orthogonal frequency division multiplexing (OFDM) communication environment (*page 75, line 12-13, OFDM modulation is a Multicarrier Modulation for Data Transmission*) and the select tones are OFDM tones (*page 75, line 4-7, the OFDM*

modulation symbol vector is associated with a specific sub-channel having a unique frequency or tone on which the modulation symbols is conveyed).

6. **Claims 14-18, and 20-26** are rejected under 35 U.S.C 103(a) as being unpatentable over Walton et al (CA 2404055, Sep. 19, 2002) in view of Branlund et al. (US 20080181170, Jul. 31, 2008) hereinafter (Branlund).

Regarding **Claim 14**, Walton discloses a system for scheduling data for transmission during a transmit time interval in a multi-carrier communication environment comprising a communication interface (*page 74, line 20-23, After assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the data in the channel data stream is modulated using multi-carrier modulation, page 31, line 19-25, requests for data transmissions are received from various users (plurality of users) throughout the system. The cells are then tasked to schedule the data (scheduling the data) transmissions and to assign channels to the users*); and a control system associated with the communication interface and the network interface, the control system configured to determine channel condition indicia for a plurality of users (*page 18, line 5-10, each cell can measure the performance of the channels and self-impose blocking on poor performing channels until there is reasonable certainty that the channel conditions has improved and that reliable communications can be achieved*);

and in an iterative manner pre-assigning select tones for each remaining user of the plurality of users(*page 27, line 5-6, The iterative process (iterative manner) can continue until the effective link margins for the cells*),

which have not been permanently assigned tones for the transmit time interval (*page 74-75, line 5-7 and 20-25, data processor 1520 assigns each channel data stream (not permanently assigned tones) to one or more sub-channels, at one or more time slots, and on one or more antennas, after assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s)*);

selecting a remaining user having least favorable channel conditions as an active user (*page 46, line 15-22, Channels assigned to users with conditions. Such conditions may include, limitation on the data rate, a maximum transmit power, restriction on the set point, and so on. A maximum data rate imposed on a channel (favorable channel condition) assigned to an active user*);

wherein once the select tones are permanently assigned to the active user, the active user is no longer a remaining user(*page 43, line 15-22, if channel metrics based on outage probability are employed(assigned), the selected user is assigned the channel with the highest outage probability. The assigned user is then removed from the list of active users, at step 1018. A determination is then made whether the active user list is empty (no longer remaining user), indicating that all active users have been assigned channels*).

Walton discloses all aspects of the claimed invention, except *a network interface; and permanently assigning to the active user the select tones pre- assigned to the active user.*

Branlund is the same field of invention teaches a network interface(*page 1, par(0007), line 1-4, wireless communication network in includes a base that communicates (through network interface)with remote units located in a cell of the network*); and permanently assigning to the active user the select tones pre- assigned to the active user(*page 6, par(0150), line 3-6, every active user a cell of the network is assigned a preamble sequence and a designated partition (permanently assigning OFDM tones) for requesting system access over a channel*).

Walton and Branlund are analogous art because they are from the same field of endeavor of access to a service device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Walton to include the teaching of Branlund because it is providing OFDM, a digital processing architecture includes fast transforms, and beamforming and null steering algorithms and stacked carrier spread spectrum to increase system capacity.

Regarding **Claim 15**, Walton discloses the select tones permanently assigned to active users are no longer available for pre-assignment to the remaining users(*page 43, line 15-22, if channel metrics based on outage probability are employed (assigned), the selected user is assigned the channel with the highest outage probability. The assigned*

user is then removed from the list of active users, at step 1018. A determination is then made whether the active user list is empty (no longer remaining user), indicating that all active users have been assigned channels).

Regarding **Claim 16**, Walton discloses the control system is further configured to initiate scheduling for the transmit time interval for the plurality of users using the select tones permanently assigned to each of the plurality of users (*page 31, line 20-25, The scheduling of the data transmissions and the assignment of the resources to the users can be achieved based on a number of factors. Such factor may includes, the priority assigned to active users, criteria related to fairness, and one or more channel metrics*).

Regarding **Claim 17**, Walton discloses for each remaining user, to pre- assign the select tones, the control system is further configured to sort tones in light of channel condition information (*page 46, line 15-22, Channels assigned to users with conditions. Such conditions may include, limitation on the data rate, a maximum transmit power, restriction on the set point, and so on*); and select ones of the tones having most favorable channel conditions as the select tones (*page 46, line 15-22, Channels assigned to users with conditions. Such conditions may include, limitation on the data rate, a maximum transmit power, restriction on the set point, and so on. A maximum data rate imposed on a channel (favorable channel condition) assigned to an active user*).

Regarding **Claim 18**, Walton discloses for each remaining user, to select ones of the tones, the control system is further configured to minimize a number of tones pre-assigned as select tones while ensuring a target data rate is achieved in light of the channel conditions associated with each of the select tones (page 74-75, line 5-7 and 20-25, data processor 1520 assigns each channel data stream (pre-assigning select tones) to one or more sub-channels, at one or more time slots, and on one or more antennas, after assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the data in the channel data stream is modulated using multi-carrier modulation, the collection of these modulated symbols are all orthogonal to one another at each time slot and for each antenna).

Regarding **Claim 20**, Walton discloses factor for each remaining user based on the channel condition indicia (page 31, line 20-25, *The scheduling of the data transmissions and the assignment of the resources to the users can be achieved based on a number of factors (scheduling factors). Such factor may includes, the priority assigned to active users, criteria related to fairness, and one or more channel metrics (channel conditions)*); and select the remaining user having the least favorable scheduling factor as the active user (page 31, line 20-25, *The scheduling of the data transmissions and the assignment of the resources to the users can be achieved based on a number of factors (favorable scheduling factors). Such factor may includes, the priority assigned to active users*).

Regarding **Claim 21**, Walton discloses all aspects of the claimed invention, except *the data scheduled for transmission is real-time data*.

Branlund is the same field of invention teaches the data scheduled for transmission is real-time data (*page 37, par (0711), line 3-6, the spectral tone constellation encoder 702, IDOFFT modulator which converts complex tones into real time data for transmission*).

Regarding **Claim 22**, Walton discloses all aspects of the claimed invention, except *the data scheduled for transmission is voice information*.

Branlund is the same field of invention teaches the data scheduled for transmission is voice information (*page 12, par (0256), line 3-6, A channel divided into smaller, lower rate channels for specialized transmissions such as voice transmissions*).

Regarding **Claim 23**, Walton discloses groups of the tones with a time and frequency continuum associated with the transmit time interval are associated with channels(*page 16, line 20-25, The cells can (continuously) transmit to users using the allocated frequency bands, the available resources are allocated in a manner to achieve high efficiency*), and the tones are pre-assigned to the remaining users and permanently assigned to the active users according to corresponding channels(*page 74-75, line 5-7 and 20-25, data processor 1520 assigns each channel data stream (pre-assigning select tones) to one or more sub-channels, at one or more time slots, and on one or*

more antennas, after assigning each channel data stream to its respective time slot(s), sub-channel(s), and antenna(s), the data in the channel data stream is modulated using multi-carrier modulation, orthogonal frequency division multiplexing (OFDM) modulation is used and the modulation symbol vector is associated with a specific sub-channel having a unique frequency or tone (permanently assigned) on which the modulation symbols is conveyed, the collection of theses modulated symbols are all orthogonal to one another at each time slot and for each antenna).

Regarding **Claim 24**, Walton discloses all aspects of the claimed invention, except *groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead.*

Branlund is the same field of invention teaches the groups of tones are associated, and further comprising effecting signaling for scheduling based on the groups of tones to reduce signaling overhead (*page 38, par (0715), line 3-6, The goal is to minimize constant overhead by using optional extended MAC header, which are used for short and more frequent MAC messages, such as bandwidth request, partition allocation, timing adjustment, etc).*

Regarding **Claim 25**, Walton discloses the number of tones pre-assigned to remaining users increases with each re-transmission attempt (*page 42, line 35-38, if the user's expected outage probability for a particular channel is excessive(increases),*

there could be a reasonable likelihood that the entire transmission on that channel will be corrupted and needs to be re-transmitted.

Regarding **Claim 26**, Walton discloses the multi-carrier communication environment is an orthogonal frequency division multiplexing (OFDM) communication environment (*page 75, line 12-13, OFDM modulation is a Multicarrier Modulation for Data Transmission*) and the tones are OFDM tones (*page 75, line 4-7, the OFDM modulation symbol vector is associated with a specific sub-channel having a unique frequency or tone on which the modulation symbols is conveyed*).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are:

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IQBAL ZAIDI whose telephone number is 571-270-3943. The examiner can normally be reached on 7:30a.m to 5:00p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NGO RICKY can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Pao Sinkantarakorn/
Examiner, Art Unit 2464

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